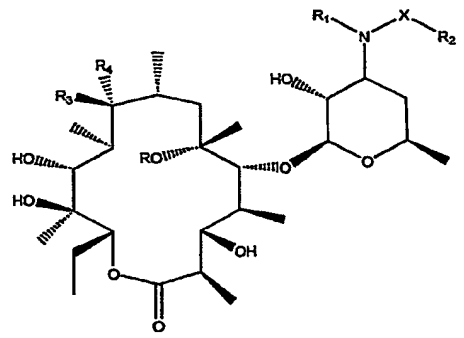
Claims

1) A compound of formula



(I)

wherein

X is a -C(=O)-, -C(=O)-O-, -C(=O)-N-, $-SO_2-$ or $-SO_2-N$ group;

R is a hydrogen atom or methyl;

R_1 is a hydrogen atom or a (C_1-C_3)-alkyl group;

R_2 is a hydrogen atom, a (C_1-C_4)-alkoxy-(C_1-C_4)-alkyl group, a (C_5-C_7)-cycloalkyl group, a phenyl or a five- or six-membered heteroaryl having from one to three heteroatoms selected among nitrogen, oxygen and sulphur, a phenyl-(C_1-C_4)-alkyl or heteroaryl-(C_1-C_4)-alkyl group optionally substituted by 1 to 3 substituents selected among a (C_1-C_4)-alkyl group, a (C_1-C_4)-alkoxy group and halogen, or a chain of formula

$$-(CH_2)_r-Y-(CH_2)_m-A$$

wherein

A is a phenyl or a five- or six-membered heteroaryl having from one to three heteroatoms selected among nitrogen, oxygen and sulphur, both ones optionally substituted by 1 to 3 substituents selected among a (C_1-C_4)-alkyl group, a (C_1-C_4)-alkoxy group or halogen;

Y represents O, S or NR_6 wherein R_6 is a hydrogen atom, a linear or branched (C_1-C_3) alkyl, a (C_1-C_3)-alkoxycarbonyl group or a benzyloxycarbonyl group;

r is an integer comprised between 1 and 3;

m is an integer comprised between 0 and 3;

R_3 is a hydroxy group or R_3 taken together with R_4 forms a (=O) group or a =N-O-R_5 group wherein R_5 is a hydrogen atom, a (C_1-C_4)-alkyl group, a benzyl or a –X-R_2 group wherein X and R_2 have the corresponding meanings defined above;

R_4 is a hydrogen atom or R_4 taken together with R_3 forms a (=O) group or a =N-O-R_5 group wherein R_5 has the meanings defined above;

and furthermore R_2 is a (C_1-C_{10})-alkyl group or a (C_4-C_{10})-alkyl group when, at the same time, X is a –C(=O)- group, R_1 is a (C_1-C_3)-alkyl group and R_3 is a hydroxy group or R_3 taken together with R_4 forms a =N-O-R_5 group wherein R_5 is different from -X-R_2;

and pharmaceutically acceptable salts thereof.

2) A compound according to claim 1 wherein R, R_1, R_2 have the meanings as defined in formula I, X is a -C(=O)-, -C(=O)-N- or -SO_2- group and R_3 is a hydroxy group or R_3 taken together with R_4 forms a (=O) group or a =N-O-R_5 group wherein R_5 is a hydrogen atom, methyl, benzyl or a –X-R_2 group wherein X and R_2 have the meanings as defined in formula I.

3) A compound according to claim 2 wherein R_1 is a hydrogen atom or methyl and R_5 is a hydrogen atom or a -X-R_2 group wherein X and R_2 have the meanings as defined in formula I.

4) A compound according to claim 3 wherein R_2 is a hydrogen atom, a (C_1-C_4)-alkoxy-(C_1-C_4)-alkyl group, a (C_5-C_7)-cycloalkyl group, a phenyl or a five- or six-membered heteroaryl having from one to three heteroatoms selected among nitrogen, oxygen and sulphur, a phenyl-(C_1-C_4)-alkyl or heteroaryl-(C_1-C_4)-alkyl group optionally substituted by 1 to 3 substituents selected among a (C_1-C_4)-alkyl group, a (C_1-C_4)-alkoxy group and halogen, or a chain of formula

$$-(CH_2)_r-Y-(CH_2)_m-A$$

wherein

A is a phenyl or a heteroaryl selected among furan, thiophene, oxazole, imidazole, pyridine, pyrimidine and triazole both ones optionally substituted by 1 to 3

substituents selected among a (C_1-C_4)-alkyl group, a (C_1-C_4)-alkoxy group or halogen;

Y represents O, S or NR_6 wherein R_6 is a hydrogen atom or methyl;

r is an integer comprised between 1 and 3;

m is an integer comprised between 0 and 3;

and furthermore R_2 is a (C_1-C_{10})-alkyl group or a (C_4-C_{10})-alkyl group when, at the same time, X is a–C(=O)- group, R_1 is a (C_1-C_3)-alkyl group and R_3 is a hydroxy group or R_3 taken together with R_4 forms a =N-O-R_5 group wherein R_5 is different from -X-R_2.

5) A compound according to claim 1 wherein R_1 is methyl and R_2 is a metoxy-(C_1-C_3)-alkyl group, a (C_5-C_7)-cycloalkyl group, a phenyl or a heteroaryl selected among furan, thiophene, oxazole and pyridine, a benzyl or heteroaryl-(C_1-C_4)-alkyl group optionally substituted by a substituent selected among a (C_1-C_4)-alkyl group, a metoxy group and halogen, or a chain of formula

$$-(CH_2)_r-Y-(CH_2)_m-A$$

wherein

A is a phenyl or a heteroaryl selected among furan, thiophene, oxazole and pyridine, both ones optionally substituted by a substituent selected among a (C_1-C_4)-alkyl group, a metoxy group or halogen;

Y represents O, S or NR_6 wherein R_6 is a hydrogen atom;

r is an integer comprised between 1 and 3;

m is an integer selected among 0 and 1;

and furthermore R_2 is a (C_1-C_7)-alkyl group or a (C_4-C_{10})-alkyl group when, at the same time, X is a–C(=O)- group, R_1 is a (C_1-C_3)-alkyl group and R_3 is a hydroxy group or R_3 taken together with R_4 forms a =N-O-R_5 group wherein R_5 is different from -X-R_2.

6) A compound according to claim 1 wherein R, R_1, R_2 and X have the meanings as defined in formula I, R_3 is a hydroxy group and R_4 is a hydrogen atom.

7) A compound according to claim 6 wherein R_1 is a hydrogen atom or methyl and X

is a -C(=O)-, -C(=O)-N- or -SO_2- group.

8) A compound according to claim 7 wherein R_2 is a hydrogen atom, a (C_1-C_4)-alkoxy-(C_1-C_3)-alkyl group, a (C_5-C_7)-cycloalkyl group, a phenyl or a five- or six-membered heteroaryl having from one to three heteroatoms selected among nitrogen, oxygen and sulphur, a phenyl-(C_1-C_4)-alkyl or heteroaryl-(C_1-C_4)-alkyl group optionally substituted by a substituent selected among a (C_1-C_4)-alkyl group, a (C_1-C_4)-alkoxy group and halogen, or a chain of formula

$$-(CH_2)_r-Y-(CH_2)_m-A$$

wherein

A is a phenyl or a heteroaryl selected among furan, thiophene, oxazole, imidazole, pyridine, pyrimidine and triazole both ones optionally substituted by a substituent selected among a (C_1-C_4)-alkyl group, a (C_1-C_4)-alkoxy group or halogen;

Y represents O, S or NR_6 wherein R_6 is a hydrogen atom or methyl;

r is an integer comprised between 1 and 3;

m is an integer selected among 0 and 3;

and furthermore R_2 is a (C_1-C_7)-alkyl group or a (C_4-C_{10})-alkyl group when, at the same time, X is a-C(=O)- group, R_1 is a (C_1-C_3)-alkyl group and R_3 is a hydroxy group or R_3 taken together with R_4 forms a =N-O-R_5 group wherein R_5 is different from -X-R_2.

9) A compound according to claim 8 wherein R_1 is methyl and R_2 is a hydrogen atom, a methoxy-(C_1-C_3)-alkyl group, a (C_5-C_7)-cycloalkyl group, a phenyl or a heteroaryl selected among furan, thiophene, oxazole and pyridine, a benzyl or heteroaryl-methyl group wherein heteroaryl is selected among furan, thiophene, oxazole and pyridine, optionally substituted by a substituent selected among a (C_1-C_4)-alkyl group, a metoxy group and halogen, or a chain of formula

$$-(CH_2)_r-Y-(CH_2)_m-A$$

wherein

A is a phenyl or a heteroaryl selected among furan, thiophene, oxazole and pyridine, both ones optionally substituted by a substituent selected among a methyl group, a

metoxy group or halogen;

Y represents O, S or NR_6 wherein R_6 is a hydrogen atom;

r is an integer comprised between 1 and 3;

m is an integer selected among 0 and 1;

and furthermore R_2 is a (C_1-C_7)-alkyl group or a (C_4-C_{10})-alkyl group when, at the same time, X is a–C(=O)- group, R_1 is a (C_1-C_3)-alkyl group and R_3 is a hydroxy group or R_3 taken together with R_4 forms a =N-O-R_5 group wherein R_5 is different from -X-R_2.

10) A compound according to claim 9 wherein R_2 is a methoxy-methyl group, a cycloesyl, a phenyl or a heteroaryl selected among furan, thiophene, oxazole and pyridine, a benzyl or thiophen-il-methyl group optionally substituted by a substituent selected among a methyl group, a metoxy group and halogen, or a chain of formula

$$-(CH_2)_r-Y-(CH_2)_m-A$$

wherein

A is a phenyl or pyridine, both ones optionally substituted by a metoxy group;

Y represents O, S or NR_6 wherein R_6 is a hydrogen atom;

r is an integer comprised between 1 and 3;

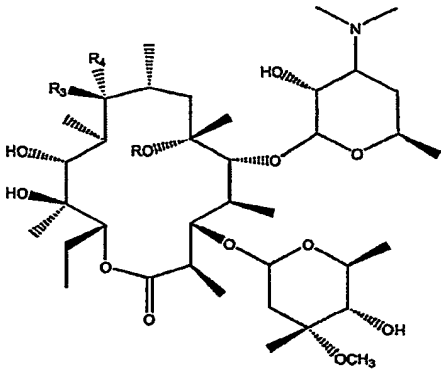
m is an integer selected between 0 and 1;

and furthermore R_2 is a (C_1-C_7)-alkyl group or a (C_4-C_{10})-alkyl group when, at the same time, X is a–C(=O)- group, R_1 is a (C_1-C_3)-alkyl group and R_3 is a hydroxy group or R_3 taken toghcter with R_4 forms a =N-O-R_5 group wherein R_5 is different from -X-R_2.

11) A compound according to claim 1 wherein the -X-R_2 substituent in the meanings of R_5 has the same meanings of the X and R_2 substituents at 3' position.

12) A process for the preparation of a compound according to claim 1 which comprises:

a. the demethylation of the dimethylamino group at 3' position of a compound of formula



(II)

wherein

R, R_3 and R_4 are as defined as in claim 1;

b. the removal of L-cladinose by a hydrolysis reaction;

c. the amidation reaction of the primary or secondary aminic group obtained by item a.

13) A process according to claim 12 wherein R_3 in formula II is a hydroxy group and R_4 is a hydrogen atom.

14) A process according to claim 12 wherein the removal of the cladinose is carried out by an acid catalyzed hydrolysis in presence of a mineral acid and of a protic organic solvent.

15) A pharmaceutical composition comprising a therapeutically effective amount of a compound according to claim 1 in admixture with a pharmaceutically acceptable carrier.

16) A pharmaceutical composition according to claim 15 useful in the treatment of inflammatory diseases.

17) A pharmaceutical composition according to claim 15 useful in the treatment of respiratory diseases.

18) A pharmaceutical composition according to claim 16 useful in the treatment of gastrointestinal diseases.